The Builder

VOLUME FOR 1855.

WE cannot select a better subject for illustration in the first number of our new volume than the noble municipal building recently inaugurated in Liverpool.

St. George's Hall stands prominently on the rising bank of the Mersey, on the north-east side, about half-a-mile from the sea. From the mouth of this famous estuary it presents an imposing mass, towering over the city; and if, as it has been suggested, on its lofty roof a golden globe were proudly affixed, glittering in the sun, it would be the first object seen by the homeward-bound, to welcome their return, while it would aptly symbolize that sphere which the indefatigable commerce of its merchant princes has subjugated to the purposes of wealth and prosperity to our whole community.

St. George's Hall is situated on a rapid declivity, covering, together with its area and approaches, about 3½ acres. The building itself, 490 feet long by 165 feet wide, occupies the western or lower side of the site, which, being raised by a magnificent sub-basement, as it were upon one vast step, correcting the natural defect of the ground by a terrace occupying the whole site, presents a very elevated and striking aspect, and seems to derive even an advantage from the accident of the declivity.

The vastness of this plan, dedicated, as the inscription declares, "to the laws, the arts, and the councils of Liverpool," is the first subject of our admiration, surpassing, as we believe, any building of the kind in Europe. Perhaps the rival in extent and regularity that best compares with it is the Bourse of Paris, which covers about one-third less: the order also of the latter is only 50 feet, that at St. Paul's is 48 feet, while that of St. George's Hall is 56 feet 6 inches.

The symmetry and beauty of the arrangement next attract our attention. The great central hall, 169 feet long by 100 feet in the entire width, including corridors leading to the several offices of the courts and town, is terminated by the Criminal and Nisi Prius Courts of Justice. At the south end is the entrance to the grand jury rooms and dependants' offices, and at the north is a magnificent entrance-hall, leading to a music-room, equal to the largest theatre, being 88 feet long by 72 feet wide. The many subordinate appendages to these leading features will speak for themselves on the plan we append.

The arrangement of the plan is a delightful contemplation to the learned architect, and displays a knowledge of all the best examples and principles of architectural science, which the labour of a life would seem necessary to bestow on the experienced veteran, and which, in the youthful author of this work, seems little short of divination.

The mediæval system of commensuration, by a modulus of 13 feet, gives uniformity and proportion to all the parts,—especially in the hall it will be found to be exactly carried out. The modulus established by the axes of the columns (13 feet) being doubled in the width or depth of the portico, reproduces an admired feature of Classical architecture, the pseudo-dipteral peristyle flank of the Grecian temple; the axes of the interior granite columns of the hall are equally two moduli, or 26 feet; the entire length and width of the hall are 13 moduli by 8 moduli.

In the south front and courts this division is dispensed with, for overruling reasons. The systyle of the flank is changed in the south front to the more appropriate picnostyle; and we have the reproduction of the front of Jupiter Stator in the Roman Forum, varied only in the entablature, which is somewhat less rich and massive.

Nothing can better display the judgment of the young architect than the variation here remarked. The pedant would have enforced his modulus throughout, but the man of genius considers that the exception often proves the rule, and time, place, and circumstance are to have their due influence in the work. The elongated systyle intercolumniation harmonizes with the elongated eastern flank, while the serried, or narrow picnostyle, best harmonized with the narrower end of the building. In so doing, he reproduced to the English eye a most admired example of classical taste; and the brightest ornament of the Roman Forum, the Temple of Jupiter Stator, is displayed in England for the first time,—a masterpiece of proportion and symmetry.

The same scientific daring is exhibited in the grand feature of the hall, in which the architect proposed to reproduce, but to surpass, the Roman Hall, that great crux to the architects of Europe during fifteen centuries, which none in this country had yet presumed to execute. In solid brick vaulting, fire-proof, enduring, and masonic, England possesses for the first time a magnificent specimen of Roman grandeur, worthy of our not less than Roman country; and the trussed roof of combustible materials, its flat and plastered ceilings, are rejected and abandoned, let us hope for ever, in our enduring monuments.

The Hall of Diocletian, the last of the Roman vaults, was 79 feet between the walls, but 64 feet only between the columns, while St. George's Hall is 1 foot more wide,—65 feet between the columns, though 74 between the walls.

The span of the vault of Caracalla is 63 feet. The pendentives rest upon Aberdeen granite columns, 31 feet high, turned and polished as no classical columns ever were.

The proportion of the hall, 169 feet by 74 feet between the walls, and 83 feet high, presents 2¼ diameters of the width; the proportion of the Roman hall is generally about 2½ diameters in length,—yet we should not desire that of St. George's Hall to be altered. The proportion of the hall, as externally viewed in its vast parallelogram of 2¼ diameters raised into the air, is exceedingly satisfactory,—the breadth and simplicity of its large surfaces, unbroken by window and door-openings, and its uniform order throughout, produce an indescribable serenity, seclusion, and nobility, in this admirable building. The proportions of the order itself, and every part of the exterior, and no less of the interior, are finely and wisely ordered, and we derive that satisfaction in the contemplation of them, which has been the grand aim of all the great concurrent masters of this occult and most desired science of proportion. The contrast of the square parastas, or isolated pilaster, in the flank porticos, is new and admirable, as harmonizing with the work in which they are inserted, and relieving by their angular forms that monotony and satiety which the repetition of the column in the central portico might so easily have produced on the spectator.

Harvey Lonsdale Elmes was the author of this very remarkable work. At the age of twenty-three he obtained the premium in a large competition of the profession for the building of St. George's Hall, at first intended as a music-hall only. A competition for the building of the Assize Courts, in which he also gained the first premium, shortly succeeding, enabled him again to display his pre-eminent ability at the age of twenty-four. In the following year the two buildings, St. George's Hall and the Assize Courts, were incorporated, according to their actual form. The foundation stone was laid on the 28th June, 1838, and the work was actively prosecuted from 1841 till 1843, when, exhausted by these labours, and by the encroachments of a fatal malady, he sought the milder climate of Jamaica, in the vain hope of recovery; and there his brief career was terminated at the age of thirty-four.

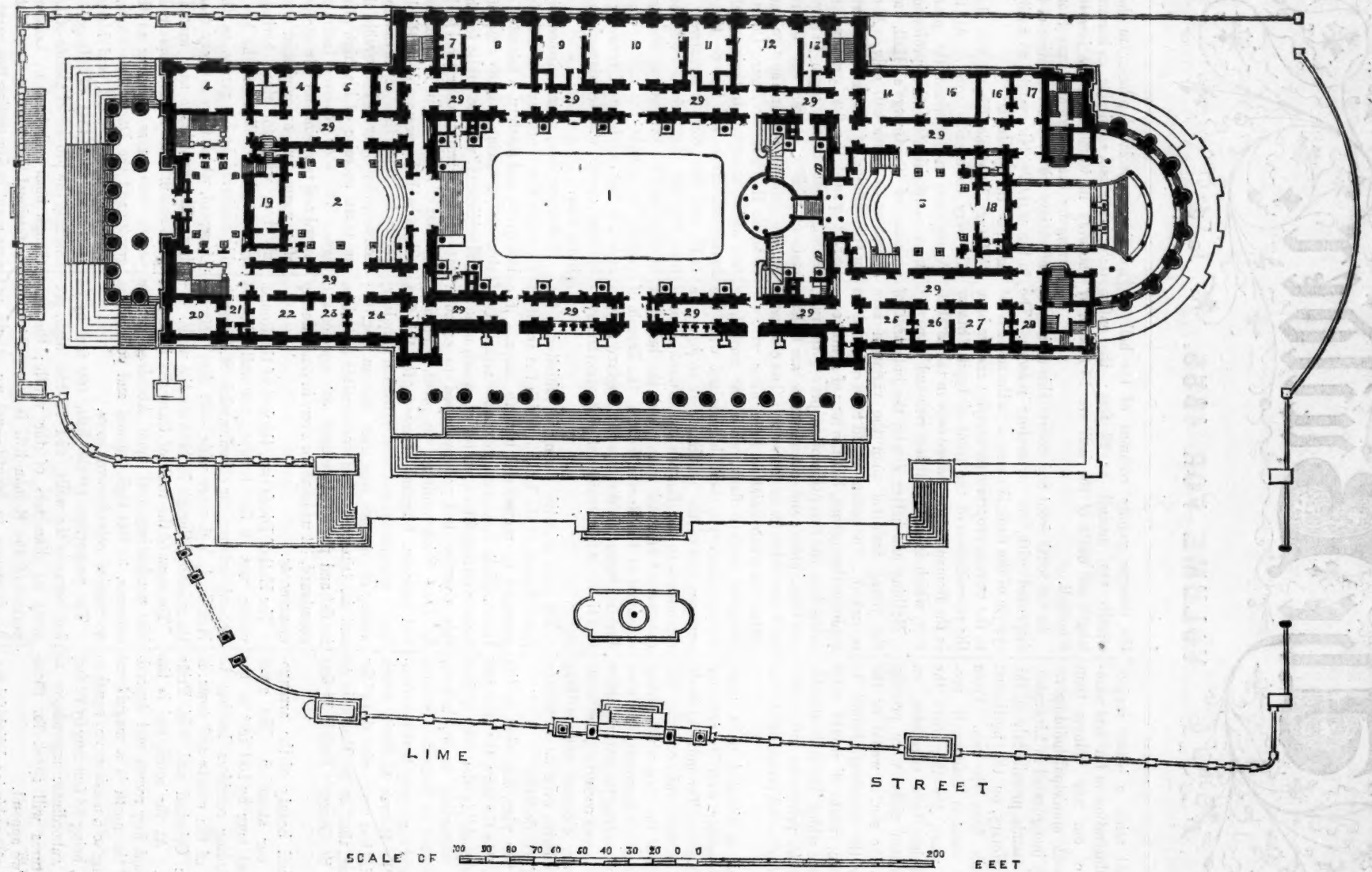
A delicate fibre, which enabled him to touch the violin like a professor, and design, with no less grace and mastery, a scientific and tasteful structure, involving so much conception, daring, and originality, was too subtle for the rude contact of such a world as ours; and his brief career, like that of a meteor, in his arduous profession will probably be memorable in the biography of architects. This title to distinction is further recommended by every honourable characteristic and moral exercise of his high gifts and privileges. Too soon removed from the means of reward and provision for his successors, he has left a young and accomplished widow and an only boy, with no other heritage than his renown and the obligations he has unquestionably conferred by his genius on the people of Liverpool, which there is every reason to hope they will acknowledge as a sacred duty. His short and brilliant life has conferred upon Liverpool a renown as enduring as the Aberdeen granite and the Darley Dale stone, which compose its massive walls, and his name will be associated with that of Roscoe and others, amongst the provincial glories of Liverpool; for though born and bred in London, his entire professional life, from the age of twenty-three, was spent in illustrating this great and spirited commercial emporium.

If the beasts of burden which drew the Pentelic marble of the Parthenon to its final resting-place, were honoured and preserved in green pastures for the remainder of their days by the Athenian gratitude, how much more sensibly will this duty be felt by the liberal and Christian population of Liverpool, and so to see the widow and orphan of their benefactor decently provided for and sustained in the social rank to which they have so distinct a title.

Since the year 1847, Mr. Cockerell has more or less directed the finishing of this important work. The pediment, from his design and under his superintendence, had already been

REFERENCES.

1. St. George's Hall.
2. Crown Court.
3. Nisi Prius Court.
4. Grand Jury-room.
5. Sheriff's Court.
6. Jury's Retiring-room.
7. Judge's room.
8. Sheriff's Court.
9. Conference-room.
10. Library.
11. Robing-room.
12. Vice Chancellor's Court.
13. Judge's room.
14. Solicitors' room.
15. Office.
16. Sheriff's Private-room.
17. Prothonotary.
18. Judge's room.
19. Judge's room.
20. Record-room.
21. Ante-room.
22. Witnesses' room.
23. Solicitors'-room.
24. Female Witnesses' room.
25. Female Witnesses' room.
26. Solicitors' room.
27. Witnesses' room.
28. Jury's Retiring-room.
29. Corridors.



GROUND PLAN OF ST. GEORGE'S HALL, LIVERPOOL.

in hand since 1845. The symbolism is trite, as such compositions should always be, as addressed to the common observer. Britannia armed, her lion by her side, and seated on a rock, holds in her left the olive-branch, and in her right the spear. She hails the four quarters of the globe, presented to her by Mercury; the last of whom, Africa, inclines with the form of the pediment, and, with her negro children, acknowledges her obligations to the queen of freedom, who laboured so long and successfully for their emancipation: beyond are the vine and foreign productions. To her right, Agriculture and the Arts, seated in a car, represent England and her productions; the husbandman and his plough, his wife with the distaff and her child, express industry, manufacture, and domesticity, the glory of our land; at the end are labourers at the anvil, the anchor, and the arms of mail, which, when occasion offers, she can so well use. But it is in the linear composition that we derive the benefit of those studies in Greece which this gentleman is known to have prosecuted. The number and size of the figures, and their diagonal positions, are conformable to the acknowledged principles of contrast set forth in a paper by Professor Cockerell, reported in the last volume of this journal, at p. 457. But it is in the arrangement of the centre dividing this obnoxious height, commonly so destructive of due relation with the other figures of the pediment, that he has succeeded, for by placing the ocean or Mersey at the feet of Britannia, the same dimension of figure is carried throughout harmoniously, and with the best effect of lines.

In 1848 his design for the terrace and steps under the south portico was adopted, together with the scheme for the approaches, not yet entirely carried out. The elaborate finishings of the interior have been designed by this gentleman, and very arduous and responsible, no doubt, has it been felt, to handle a framework so nobly designed; and great might well be the apprehension that its grace and nobility might suffer under any hands short of that of the original master himself. The ceiling, according to the apparent system of the Romans, is covered, like a firmament, with a multitude of appropriate detail to give space and magnitude to the whole. The provincial armorial bearings and the symbols appropriate to navigation, and the municipal and legal purposes of the structure, have been largely employed. These have been circumscribed to the crowns of the side-groining arches, and not carried down to the springing of the arched vault, as is commonly the case. The whole proportion is thereby heightened, and the parallelogram of the ceiling materially elongated. The six pendentives are adorned with symbolical figures, taken from Raffaelle's compositions in the Vatican, of Temperance, Prudence, Art, Science, Justice, and Fortitude, and in the paving under these are inscriptions illustrative of each of these virtues. A rich decoration of galleries, composed of Irish black marble, Derbyshire spar ballusters, and twenty-four Irish green niches adorn the lower part of the hall, the walls being decorated with slabs of various British marbles. Two of these niches are already occupied by illustrious tenants, Sir R. Peel and George Stevenson. The six doors are very magnificent, and surpass anything of the sort yet executed in England. The jambs are in solid grey granite, in single pieces, with cornices carved in Portland stone; the gates themselves are of bronze and brass, highly elaborated. Above these are ten chandeliers, of great magnificence in size, materials, and design; they are 7 feet diameter, with 140 lights each, in the form of stars. The paving, executed by Minton, after designs by Mr. Cockerell, Mr. Gruner, and Mr. Stevens, is unexampled in tesselated workmanship. The drawing of the Tritons and Sea-nymphs, in red and yellow, is highly classical, spirited, and beautiful.

A regulation of some interest in the direction of this structure has been vigorously observed in every detail, namely, that none but British materials and British workmanship should enter into the work.

The organ, an instrument of great compass and magnificence, has long been a vexed question, as impairing the perspective of the Hall and Nisi Prius Court; and its position in this regard must ever be lamented: but after extended deliberation, and the best advice, on acoustics and musical convenience, it was finally decided to be placed at the north end of the Hall. Pains have been taken by its form and structure, to play into the lines and perspective and uses of that part of the hall.

The area in the east front, together with the niches in the hall, afford space and position for all the illustrious of our land, and will furnish, in the growth of time, a museum of art and of renown, of the utmost historical interest.

We give a view of the interior (p. 7), and shall have occasion to return to the subject.*

A CRITICAL REVIEW OF ST. GEORGE'S HALL AND THE ASSIZE COURTS, LIVERPOOL.

AN example of classical architecture, fairly subdued to our service, and applied to our purposes, and thus made a creature, as it were, of the day and country, is a rarity at the present time, though it is the application of the ancient architecture that common sense dictates, and the only one that men who use their mental faculties, and intellectually and really live in England, and the nineteenth century, could make; for when climate, or some important circumstance differs with every parallel of latitude, and every meridian of longitude, and when change comes in with every generation of mankind, what age, what nation, can furnish us with a design, or do more than give us hints, teach us principles, or yield us elements? And even as regards these, life with us being neither Roman, nor Greek, nor Italian, our social system being more complicated, and its exigencies more multifarious than that of any ancient one, we must not adopt Italian only, nor Greek only, nor Roman only, but all of them: we want the warm and picturesque of Italy, the cool, and chaste, and solemn of Greece, and all intermediate qualities. If I adopt Greek only, or Italian only, I soon find that I have not a sufficient range,—it takes them all to give body to the great spirit of modern architecture, and compose a system sufficiently copious for the present day.

Italian architecture seems to be generally conceived of as a thing quite distinct from the antique, as if with the Greek it had no relation whatever; but pure Italian architecture *is* Greek architecture, heaved up again by the wave of time, fitted for the resumption of its ancient career in the fulfilment of purposes additional to those it was applied to by its inventors. And the architect who adopts the classical architecture has a right to avail himself of the purer elements of the Italian style, which, had its framers never existed, would in the working out of a modern system from the antique ordonnance, naturally have arisen to the inventive mind.

Rightly to use the columnar architecture of the Greeks, the architect must, therefore, conceive his design in the pure spirit that created it, and maintain that spirit when he is working upon ground that is peculiarly modern, and dealing with forms required by a new mode of life, and for which antiquity furnishes no precedent. Full limited is the sphere of ancient art, but in pursuing paths beyond its range, opened up by modern wants, his course must frequently run so parallel with the art of ancient Rome and modern Italy, that he may avail himself of their suggestive aid, and borrow or make an enlightened adoption of many of their elements while he takes care to avoid the contamination of their vices, and also to test all knowledge from their reflected lights by the great and primary luminary of all nature herself.

An illustration of something like this is, I think, to be found in St. George's Hall, which is an application of classical architecture to the service of the day, evincing more than the usual freedom and breadth of mind in its author, who, though he has not for his ornamentation drawn upon the nature around him as directly and freely as she may be and *will* be (for classic architecture has its career yet to run in England); though he has not proved how beautifully and harmoniously such ornamentation will blend and unite with antique constructive forms; yet evidently went back to the fountain-head of art-elements, surveyed the whole stream, and feeling himself a master, used the materials he drew from it with authority. Adopting a columnar ordinance of Greek purity as the general framework of his design, he has not refused to let it embrace and draw into itself whatever had a natural affinity for it, or was capable of being brought into it in the crucible of art, no matter whence derived; and by so working has done much towards proving the strangely disputed power of vital development to meet the growing exigencies of the world, inherent in the style; for St. George's Hall, while it exhibits some of the finer qualities and properties of the ancient system, while it presents the style in its pristine purity, free from Roman and other vices of design, yet unfolds to us something of its breadth and power, its richness and vastness of resource, and stands forth a material and enduring contradiction, echoed from plinth to cornice, from column to pilaster, to those traducers of the style who declare it to cramp invention and render plagiarism a necessity.

With these elements its architect has given an appropriate character to the edifice, and avoided the reproach that attaches too well to the general practice of the day, which, reversing Shakspeare, erects *gorgeous temples* and *solemn palaces;* and the merit of this is enhanced in our estimation by a recollection of the distracting circumstances under which he had to work: I allude to the destination of the building to contain apartments devoted to two different and conflicting purposes, causing difficulties if not impossibilities which no architect should be called upon to contend with. Simplicity and singleness of purpose are essential to a great architectural conception, and to a high class work of art, a high and poetic one. A building intended, as was St. George's Hall, to rank among our national monuments of architecture, should have been for one purpose, and that of the most elevated and poetic nature that the town and times demanded; and I think it matter for regret, that leaving law and justice to seek quarters more befitting their matter-of-fact character, the building in question was not devoted exclusively to the muses, and made a worthy abode not for one but all the fine arts, in which painting, sculpture, and architecture might hold their exhibitions, and literature its meetings; for why should one art be so much distinguished above the rest? What right has music to this high and solitary enthronement? The sweet science, however, has perhaps not so much to boast of, for it was assuredly never more unpleasantly associated, raised, as the hall is, over the cells of the condemned, and the view into the courts, so much contended for as an artistic advantage, revealing a place where men are tried for their lives.

By the employment of a suitable order, properly treated in all its details, an appropriate expression is given to the exterior, which is at the same time a true exponent of the interior arrangement or plan; for while the one great chamber, the music-hall, has full voice in the external symphony, the law courts, and small surrounding apartments, have sufficient artistic utterance; and it is worthy of remark, that the central attic order, with its delicately inclined roof, that forms the unique crown to the build-

* With reference to the notice of a paper and discussion on St. George's Hall, read by Mr. Huggins, at the Liverpool Architectural Society, and which appeared in our journal (vol. xii. p. 653) and in one of the local papers, Mr. Huggins has written to us to deny its correctness. It was sent to us in such a way as to prevent us doubting its accuracy at the time it was inserted. We have also received an indignant letter from "The Father of the Architect:" it is rendered to some extent unnecessary by the denial; but there are some portions of it for which we shall endeavour to find a place. We now print the paper itself.

ing externally, and raises it into beautiful composition, is not a merely expletive feature put on for outward effect, but one that, in containing the vaulted ceiling of the great hall, while it supplies a practical exigency of the interior, meets at the same time an æsthetic demand of the exterior.

Without following too closely any celebrated type, or recombining common-place and hackneyed features, the exterior composition of St. George's Hall exhibits much artistic geniality in its conception. With front planes of sufficient elevation for nobleness of aspect, it is yet gracefully pyramidical in general outline, each façade showing, for the most part, in addition to the front ones, two other ranks of vertical planes; and the manner in which this general form of composition, so entirely in keeping with the nature and the style of the architecture, is preserved at the back by the insulated screen of semi-detached pilasters forming what may perhaps be termed a hypæthral loggia, though such an expenditure of material for mere effect would not be justifiable in a lower class building, is, I think, here worthy of admiration. In a domestic building we should be content with the irregular or merely picturesque form that its essential parts assume; but in a monumental work, the contrivance alluded to, instinct as it is with a vernal freshness of idea, is a worthy sacrifice to the great and solemn character that must be preserved.

The absence of uniformity between the north and south ends, which has been objected to, is to be defended in the first place on the ground of its increasing an element of beauty in the building—variety, which should not be sacrificed to a beauty that can only be appreciated on paper, in contemplation of the ground-plan. By the existing disposition, the spectator of the south-east view has, on arriving at Shaw's brow in his perambulation of the building, a new aspect presented to him by the circular end. While at either end he cannot see that the other is different; at least, there is no point of view from which the difference between the two ends can give offence. It is to be defended in the second place, on the ground of its being dictated by the arrangement of the interior, where the provision of a concert-room renders the north end entirely different to the south. This breach of uniformity might be a valid objection in a church or other building, where there is but one great apartment, the influence of which is naturally allowed to arrange apartments so small and insignificant as vestry or robing-room, in complete symmetry around it; but where, beside the great room, an uneven number of smaller ones, or any number of unequal ones, is called for, the whole is naturally thrown out of symmetry, and an irregular exterior disposition is suggested, so that the difference between the facades is a departure in the right direction from the beaten and monotonous track. How far it is such will be apparent to any one who has felt the wearisome sameness of our revenue buildings, whose two extreme porticoes, though they can never be seen together, and though they are entrances to parts of the edifice totally different in plan, are *facsimiles* of each other, and, taken with the centre one, as alike as so many peas.

Nevertheless, I must respectfully dissent from Mr. Fergusson on this subject, who, in his "Historical Inquiry into the Principles of Beauty in Art," considers irregularity to be a characteristic of all great buildings. I believe, that where the purpose of a building is such that it can consistently be perfectly symmetrical within, so that a line drawn through the centre would divide it into equal and like halves, it should be so without, and that it would be in consequence a more perfect building.

The real defect of the north end, for it has a defect, is not in its want of uniformity to the south, but in its having columns applied in a manner inconsistent with the spirit of the style, to the formation of a pseudo portico, instead of a real one, which, if, in consideration of interior exigencies, or of its facing the north, where the beauty produced by the varying light and shade could not be had, it was deemed inadvisable to have, still the circular end had been more properly relieved by attached pilasters of the usual projection, which would have given more repose to that part of the edifice.

It is to be questioned, however, whether the circle should have been so introduced in the plan at all in a building terminated above by a square form which the round end must render less pleasing and harmonious as a crowning feature than it otherwise would be.

It is not ultra-classicism, but false classicism that would cavil at the insular pilasters, in adopting which, the architect obeyed laws which, though not dreamt of in the philosophy of all, are yet quite legitimate. As a column is simply a round post raised from its low estate of mere utility to shine a sun-bright glory in the realm of art, so is the insular pilaster pervaded by the new spirit of the beautiful a glorification of the square one, which nobody objects to in its primitive condition. As they (the square columns) stand before us in St. George's Hall, they contribute largely to repose, while it is to their introduction that the building is chiefly indebted for the perfect unity between the porticoes and the masses which flank them on either side. Without pilasters of some kind, to prolong, as it were, the tones of the portico colonnade along the wings of a façade, no portico will properly blend with a building: the walls must have pilasters attached or detached, and I think the building under notice proves that the latter are more effectual in accomplishing this difficult object. The insular pilaster stands in respect of geometrical form and character between the wall-pilaster and the detached column; and it is this peculiarity, along with the continuance of the entablature entirely around the building, that gives St. George's Hall its singular unity of composition.

Reviewers of St. George's Hall, like most critics of art, who but seldom rise to the contemplation of the subject as a whole, have bestowed the staple of their praise on the graceful forms and proportions of the east and south porticoes, and said but little about the other elements composing the façades. But these porticoes might be all that their greatest admirers have pronounced them to be, and yet the building be an abortion as a work of art. The south one might be the front, and the east one the side of some Greek peripteral temple cut to pieces for the purpose, and stuck on in the approved manner to a lifeless body. The great characteristic merit of St. George's Hall lies not in the well-combined arrangement of the symmetrical parts of these porticoes, but in the perfection with which each, and especially the eastern one, unites with the trunk of the building, and makes harmony with the flanking wings; and this unity, in which I consider St. George's Hall is unrivalled by any modern building, is mainly owing to the features and peculiarities in question, namely, the semi-attached pilasters and their intercolumnar walls, which latter contribute much to the repose, and save the façades from the monotony apt to be attendant on the peripteral disposition.

So far from the south portico being the chief beauty of the edifice, I believe, if that and the north pseudo-portico had been omitted, and St. George's Hall had consisted alone of the eastern colonnade and flanking wings of insular pilasters, possessing, as it then would, greater simplicity of form,—a form but one remove, instead of two, from the Greek temple,—it would have been a more perfect building than at present, though as it is, I deem it one of the finest pieces of exterior architecture in the world.

Though the general arrangement and treatment of the classic features and elements just noticed are original and excellent, resulting in an attic refinement and grace that is above all praise, there is yet one quality which I would wish to see more abundant in the building, namely, repose, the needful degree of which it appears to me that the extreme wings or mural masses with their engaged pilasters, along with the dwarf intercolumnar walls, are insufficient to produce.* S. H.

MR. EDWARD PRENTIS.—Mr. Edward Prentis, an artist who made English domestic life a chief study, has recently died, in his 57th year, leaving a wife and no less than eleven children to lament his loss.

* To be continued.

EDWARD JAMES WILLSON,

ARCHITECT, F.S.A.

Born in Lincoln, June 21, 1787; died in the same city Sept. 8, 1854; and buried at Hinton, near Lincoln, with his parents.

THE name and literary qualifications of the above gentleman must be well known to those architects of the modern school who have studied and had occasion to design any recent works in imitation of, or based on the principles of the miscalled "*Gothic* Architecture" of the mediæval age. It has frequently appeared publicly; first, in the account of Lincolnshire, part of the "Beauties of England;" next, in the "Architectural Antiquities;" afterwards in the "Cathedral Antiquities;" and, more specifically, in Pugin's "Specimens," and in "Examples" of Gothic Architecture. In these different works may be seen many writings from his pen, all manifesting intimate acquaintance with the Christian architecture and archæology of England. They allude to and serve to show the history, design, science, and what may be called taste, as inherent and displayed in ancient buildings, with their ornaments and appendages: in furniture, costume, and other objects belonging to the manners and customs of our ancestors. From many years' intimacy,—from a correspondence embracing more than five hundred letters on topographical and archæological subjects,—and from the examination of much manuscript for and proofs from the press, I am enabled to speak confidently and securely on the acquirements and mental qualifications of my esteemed friend. When in his teens, and working for his father, who was a respectable builder in Lincoln, I met him in the cathedral of his native city, where he was occupied in carving some of the fine stall work, which first awakened his young fancy and admiration for that species of beauty. I found him not only well informed on the history of the august edifice, which had become at once a school-house for study, and a seducing reward to his heart and intellect. I spent two or three happy days in viewing the antiquities of that extraordinary city, where Anglo-Roman, Saxon, and other antiquities of later ages abounded. I secured his company and exciting conversation, in visits to the very curious and interesting church of Stow, the seat of the Saxon bishops of the see; to Tattershal Castle, the most remarkable mansion-fortress of the kind in England; to Boston, where a gorgeous parish church and land-mark tower are to be seen; to Thornton Abbey, once a vast building, now a picturesque ruin, and to several other places. These journeys and this association became eminently beneficial both to the young topographer and his younger pupil, for both were inquiring, and incited to study, think, and act. The latter first employed his inexperienced pen in writing accounts of these and other antiquities for the "Beauties of England," which the former revised for the press. A friendship was cemented for life between the two, and whilst the professional author was actively and diligently occupied in writing for, and publishing "The Architectural Antiquities of Great Britain," "The Cathedral Antiquities," and "The Picturesque Antiquities of English Cities," the Lincoln architect (for Mr. Willson became qualified to act in that branch of art soon after the decease of his parent) continued to furnish papers and detailed drawings for each of the publications above announced. On all occasions, I may be allowed to state, that his communications were duly acknowledged, and the writer was paid for his labours and expenses. For my unfortunate work, "The Dictionary of Architecture and Archæology," he rendered occasional aid, and was thanked, with other correspondents and friends; but made up as that was, from numerous sources, I could not easily identify and particularise each and every one. I must, however, assert, that in the said dictionary, and all other substantial publications, I have been more than commonly scrupulous in clearly and fully acknowledging every quotation and every source, whence authentic information has been derived. I wish it were in my power to say the same of many writers who have copied from and profited by my labours and exertions, and from my pecuniary sacrifices.

From what has been said of Mr. Willson's

devotion to, and knowledge of antiquities generally, and especially of those connected with the "olden times," particularly churches, abbeys, castles, and mansions; and coming under the names of Ancient Christian, Castellated, and Domestic Architecture, it may be reasonably inferred that he was a "lover of books," a diligent student, a "bibliomaniac." He was all these, and had filled his house—mostly through my agency and mediation—with tomes of all sizes and of all ages. Since his decease, a sale for two days has been devoted to these literary treasures, and from the catalogue, we are informed that his readings extended over nearly the whole field of literature, and comprehended not merely archæology and architecture, but all departments of learning, science, and the fine arts.

Having thus shown the early career of Mr. Willson in the study and elucidation of architectural antiquities, it will be expedient to bring under notice the publications in which he was more directly concerned, and from which his knowledge and opinions may be more especially ascertained. There were two different works, which appeared before the public, and are recognised in book catalogues as "Pugin's Specimens of Gothic Architecture," 2 vols. 4to. 1820-25, and "Pugin's Examples of Gothic Architecture," 2 vols. 4to. 1826. The first of these works was the joint property of, and published by Josiah Taylor, A. Pugin, and J. Britton. As stated in my "Auto-biography," Vol. II. p. 150, I had engaged to "write parts of the work, advise as to drawings and engravings, and conduct the business details of printing, publishing, and examining the proof-sheets of the literary matter contributed by Mr. Willson." I declined to place my name in the title-page, or in any other part of this work, as my engagements with partners in the "Architectural and Cathedral" volumes, required nearly every working moment of time; but pleased with the illustrations, and believing that Mr. Willson would relieve me from all literary labour, and that a small portion of time would enable me to manage other duties, I speculated on a share of expenses, profits, and labours. The last, however, surpassed all anticipations, and I soon found that nearly the whole business department devolved on me, for the artist had not, at that time, any knowledge of its routine and details; and Mr. Willson, like myself, was often incapable of working from severe head-aches to which he was subjected. The titles, dedications, prefaces, indexes, and other writings were by myself, and also some of the description and historical matter. The drawings were all made by Mr. Pugin's pupils, and were mostly executed with labour and skill; whilst the literary matter, by Mr. Willson, was replete with sound judgment and discretion, and its historical and descriptive details at once judicious and discriminative. The introductory pages to the two volumes on "Gothic Architecture," and on "Modern Imitations," display an intimate familiarity with previous architectural publications and criticisms, and also with existing buildings in different parts of the country. In this work Mr. Willson brought forward the first "Glossary of Technical Terms descriptive of Gothic Architecture" which had been published. This portion attained a third edition in 1825, and was intended by the author to be a nucleus for a more copious and comprehensive publication on the same subject. On completing my fifth volume of "Architectural Antiquities," I introduced a copious list of architects of the Middle Ages, and also "An Architectural Dictionary, or Glossary of Terms," used by the older writers on that subject. This was finished in 1826; and in 1835 I produced a large volume in royal octavo, of more than 500 pages, closely printed, and with forty plates by J. Le Keux, with the title of "A Dictionary of the Architecture and Archæology of the Middle Ages." Of this work only a small number of copies was printed, and it is now very rarely to be seen in a bookseller's shop. An account of the manner in which I was finessed out of this property, is printed in the "Auto-biography," already referred to.

The "Specimens" proving to be a profitable and popular publication, induced the artist to furnish another series of drawings, on a small scale for "The Public Buildings of London," a work in two volumes, octavo, the management and writing for which I engaged to perform, as also another, in one large volume, quarto, on "The Architectural Antiquities of Normandy." In the progress of these publications the draughtsman and his friend the engraver, Mr. Le Keux, became involved in the meshes of a law net, which was thrown by the first over, and entangled the author in tantalizing litigation. A separation took place, and Mr. Pugin commenced his "Examples of Gothic Architecture," on his own responsibility and under the advice and authorship of Mr. Willson. This gentleman wrote the whole, extending to two quarto volumes; and during its progress, Mr. Pugin died, and the work was finished in the year 1836, by his executors, A. W. Pugin and Thos. L. Walker. The last gentleman afterwards published a third volume, in continuation of, and with the title of "Examples," whilst the other executor, the son of A. Pugin, wrote, etched, and published several other works on architecture, in which he produced many curious and clever designs, as well as essays and criticisms. The former exhibited much knowledge of the designs and details of buildings and monuments of the Middle Ages. Having become an inveterate Roman Catholic, after the decease of his parents, he poured forth invectives and many anathemas against Protestant architects and their works, and thereby provoked much enmity and ill feeling. How contrary to the character and principles of Mr. Willson, who proclaimed peace and goodwill to all sects, and never printed an angry word against any of his professional brethren. Yet he was born of Roman Catholic parents—professed and vindicated their tenets and practices—and believed they were the only true and genuine Christians. On this subject he and I had two or three little wordy battles, but I conditioned, at the onset, that we should fight with muffled gloves, and not hurt each other, mentally or physically, or even ruffle the smooth waters of temper.

Though Mr. Willson was not legally drilled and disciplined in an architect's office, he was schooled in the technicalities of practice in the workshop, and in the constructive science of building in his parent's business, and in studying the manifold details of the famed Minster, which was almost daily before his eye. These opportunities gave him more insight into the principles of design and construction than many students in architecture have obtained after five or seven years' attendance in some fashionable metropolitan studios. He was very early honoured by the friendly notice and patronage of the dean, his neighbour, and of Archdeacon Bayley, who recommended him to direct certain works in the Minster, and in country churches and clerical houses. Thus favoured, the magistrates of Lincolnshire, appointed him architect and surveyor to the county, an office he held for more than twenty years. That the regular clergy of the cathedral and the corporation of the city were friendly to him, is manifested by the circumstance of granting him free access to, and the use of, their respective archives and manuscript collections, from which he extracted a large mass of valuable materials for the history of the cathedral, and the topography of the city. This collection is possessed by his two sons, the executors of his will. It is hoped, however, that it may be purchased for, and deposited in, the city to which it legitimately belongs, and thereby be rendered available for the use of any future historians, topographers, and antiquaries. At the meeting of the Archæological Institute in Lincoln, in 1848, Mr. Willson's local knowledge, urbanity of manners, and valuable collections, were duly recognised and acknowledged by the council of that society, and proved very interesting to the inhabitants of the city, and to its visitors. I can never forget the cordial courtesies, and continued devotion of the Marquis of Northampton, nor the zealous and animated conduct of the scientific Bishop who then gave daily attendance to the memorable gathering of antiquaries. They animated and cheered every member and visitor, and gave an air of amenity and heartiness which never was surpassed, and perhaps may never occur again. The loss of those eminent and illustrious personages was painfully felt by all who knew them, for they were peculiarly qualified to preside at, and impart unanimity, harmony, and true friendliness to public assemblies.

On a careful retrospect of Mr. Willson's printed writings, and a long series of correspondence, by the evidence of some personal intercourse, and the testimony of familiar friends, I am justified in believing and asserting, that he was a sincere and confirmed Christian, a good and exemplary son, husband, and father, and very extensively informed, and even learned in the architecture and archæology of the mediæval age; whence he is entitled to the high praise of Pope, who proclaims,—"An honest man the noblest work of God."

Dec. 25, 1854. JOHN BRITTON.

LABOUR, CAPITAL, AND SKILL:*

KNOWLEDGE is power, we all know or believe. Charles Knight has just written a book to show us in how many ways this is true; for, according to the remark of Rousseau which he quotes, "it requires a great deal of philosophy to observe once what is seen every day." The book is a pleasant, nay, a valuable one, without pretending to tell us anything very new in point of fact, or propound anything very fresh in point of theory, but it has the interest and the charm of Charles Knight's best style and happiest mood. Like "Once upon a Time," and "The Old Printer and the Modern Press," in their own walk, both already mentioned by us, the book before us contains a large amount of information in a compact form, bearing upon the history of industrial effort, related with delightful ease, and intermixed with those curious, out-of-the-way scraps of lore which the author's copious antiquarian knowledge supplies. Altogether, a zest is lent to the subject, which makes the book charming. The volume is founded, we are told in the preface, upon two little works which the author wrote more than twenty years ago, and which were widely circulated. One of these books, "The Results of Machinery," was published in connection with the Society for the Diffusion of Useful Knowledge, at a period of great national alarm, when a blind rage against a power supposed to interfere with the claims of labour was generally prevalent, and led, in the southern agricultural districts especially, to many acts of daring violence. Happily that spirit is lessened. The spirit of knowledge has arisen; and we are told now, by an unquestionable authority, that labourers themselves begin to regard the tedious work of the flail as too irksome,—the same class that, in 1830, broke the thrashing-machines. In remodelling that portion of the volume, it has not been necessary to deprecate the evils of hostility to machinery, but rather to look forward to its more complete union with skilled labour, as the triumph of the productive forces of modern society. In the other little book upon which the volume is based, "Capital and Labour," the general subject of the *production* of wealth was popularly treated, and the argument is in this one carried forward. The writer has further endeavoured not to overlook the general relations of capital and labour in the *distribution* of wealth. As the mistakes about production have yielded in a great degree to improved education, so may those that belong to distribution also yield to the progress of knowledge. These are not mistakes which are confined to one class, and that the most numerous. The freedom of industry has as much claim to be regarded as the security of capital. In proof that these principles are better understood in another country, the author appeals to Mr. Whitworth's special Report on the Results obtained in the United States, a document from which we lately gave some extracts in our columns. Mr. Knight further remarks, that without attempting to give his volume the formal shape of a treatise on political economy, it is his wish to convey the broad parts of his subject in a somewhat desultory manner, but one which is not altogether devoid of logical arrangement. He

* Knowledge is Power: a View of the Productive Forces of Modern Society, and the Results of Labour, Capital, and Skill. By Charles Knight. Murray.

desires especially to be understood by the *young;* for upon their right appreciation of the principles which govern society will depend much of the security and happiness of our own and the coming time. As he very significantly observes,—"*The danger of our present period of transition is, that theory should expect too much, and that practice should do too little, in the amelioration of the condition of the people.*"

It is alike beyond our space and our purpose to follow the author into the chapters of consecutive argument on the questions mooted on such topics as we have indicated. To do that justice the work must be taken up. We shall be content to pick out, from the chapters relating to those matters which are of peculiar importance to our readers, some semi-anecdotical, semi-historical, memoranda.

On the common interest of Capital and Labour, we may say, with the old proverb,—

"That 'When two men ride on one horse, one man must ride behind.' Capital and Labour are, as we think, destined to perform a journey together to the end of time. We have shown how they proceed on this journey. We have shown that, although Labour is the parent of all wealth, its struggles for the conversion of the rude supplies of nature into objects of utility are most feeble in their effects till they are assisted by accumulation. Before the joint interests of Labour and Capital were at all understood, they kept separate: when they only began to be understood, as we shall show, they were constantly pulling different ways, instead of giving a 'long pull, a strong pull, and a pull altogether;' and even now, when these interests in many respects are still imperfectly understood, they occasionally quarrel about the conditions upon which they will continue to travel in company. In the very outset of the journey, Labour, doubtless, took the lead. In the dim morning of society Labour was up and stirring before Capital was awake. Labour did not then ride: he travelled slowly on foot through very dirty ways. Capital, at length, as slowly followed after, through the same mire, but at a humble distance from his parent. But when Capital grew into strength, he saw that there were quicker and more agreeable modes of travelling for both than Labour had found out. He procured that fleet and untiring horse Exchange; and when he proposed to Labour that they should mount together, he claimed the right, and kept it, for their mutual benefit, of taking the direction of the horse. For this reason, as it appears to us, we are called upon to assign to one of the companions, according to the practice of the old Knights Templars, the privilege of sitting before the other—holding the reins, indeed, but in all respects having a community of interests, and an equality of duties, as well as rights, with his fellow-traveller."

The possessions and household furnishings of the different classes in England, at different epochs, is not only a curious subject, but a correct appreciation of it is absolutely necessary to any satisfactory review of our own national history. We have a specimen taken from the ancient city of Colchester, at the close of the thirteenth century:—

"The whole stock of a carpenter's tools was valued at one shilling. They altogether consisted of two broad axes, an adze, a square, and a navegor or spoke-shave. Rough work must the carpenter have been able to perform with these humble instruments; but then let it be remembered that there was little capital to pay him for finer work, and that very little fine work was consequently required. The three hundred and ninety housekeepers of Colchester then lived in mud huts, with a rough door and no chimney. Harrison, speaking of the manners of a century later than the period we are describing, says, 'There were very few chimneys even in capital towns: the fire was laid to the wall, and the smoke issued out at the roof, or door, or window. The houses were wattled, and plastered over with clay; and all the furniture and utensils were of wood. The people slept on straw pallets, with a log of wood for a pillow.' When this old historian wrote, he mentions the erection of chimneys as a modern luxury. We had improved little upon our Anglo-Saxon ancestors in the article of chimneys. In their time, Alcuin, an abbot who had ten thousand vassals, writes to the emperor at Rome that he preferred living in his smoky house to visiting the palaces of Italy. This was in the ninth century. Five hundred years had made little difference in the chimneys of Colchester. The nobility had hangings against the walls to keep out the wind, which crept in through the crevices which the builder's bungling art had left: the middle orders had no hangings. Shakspeare alludes to this rough building of houses even in his time:—

'Imperial Cæsar, dead and turn'd to clay,
Might stop a hole to keep the wind away.'

Even the nobility went without glass to their windows in the fourteenth and fifteenth centuries. 'Of old time,' says Harrison, 'our country houses, instead of glass, did use much lattice, and that made either of wicker or fine rifts of oak, in checkerwise.' When glass was introduced, it was for a long time so scarce that at Alnwick Castle, in 1567, the glass was ordered to be taken out of the windows, and laid up in safety, when the lord was absent."

Mr. Knight's little book is full of wisdom and kindness.

PROVINCIAL NEWS.

Brierley-Hill.—The first column of the new market-place here was raised on 22nd ult. and some few stalls were expected to be ready by Saturday, the 30th. The foundation-works have been very extensive; between 5,000 and 6,000 tons of "pit bank" refuse being already carted on the spot to get it the required level. This has prevented the contractors from opening it by Christmas. The cartings are got up by Mr. Wm. Holcroft, of Bilston. The entrance-gates will be supplied by the Messrs. Haywood, of the Phœnix Foundry, Derby.

Dudley.—The exhibition of prize drawings of the several schools of art in the provinces has closed here. Many of the specimens, by young pupils, would do honour to a much older hand. Some of the designs for chimney-pieces, &c. were very good, but the principal design was one for the brazen doors of St. George's Hall, Liverpool. The erection of the new station at Dudley is deferred *sine die*, no arrangement having been entered into by the competing companies who occupy the present large area. The South Staffordshire have declined to accommodate the public using their line.

Milford Haven.—Progress has been lately made with the fortifications in Milford. The Stack Rock has been completed for some time, and the guns have been mounted, and the whole garrisoned by soldiers. At Thorny Island, at the entrance of the haven, a fort has been newly erected, and nine guns placed in it. It commands not only the mouth of the harbour, but also the whole haven up to Milford. The extensive works at Dale Point, opposite Thorny, are progressing. When completed, this battery will be able to cross fire with the one on Thorny, and command the whole haven up to Pembroke Dock, if the guns have a range long enough.

Liverpool.—A pile of business premises has been erected at the corner of George-street and in Oldhall-street, near Chapel-street, close to the Exchange. The style chosen by the architect, Mr. W. Culshaw, is Palladian. The stone dressings are from the Poolmouth quarries, near Wrexham; and the interspaces are filled in with patent red brick. The front to Oldhall-street, in the first or ground-floor story, consists of a series of segmental arches relieved by rustications. The entrance to the offices and court is through an arched gateway, with ornamental keystone, moulded dadoes, pilasters, and entablature, over which is a Venetian mirror, relieved with pilasters, entablature, and ornamental scrolls at the sides. The remaining windows of the first floor have pedimental heads and scrolls, the whole resting upon a dado balustrade. The upper windows have architraves and moulded heads, with scrolls, &c. The principal cornice is surmounted with a balustrade. The internal arrangements are adapted for brokers. The cellars extend under the whole area, and are arched with brick. They are suitable for wine-merchants and others. The persons engaged in carrying out the works are—Messrs. J. Burrows, joiner; R. Wells, stonemason; Duckworth, bricklayer; Lingard and Merrick, plumbers; T. Jones, plasterer; and W. Williams, ironfounder. The property belongs to Messrs. Myers, of this town. The outlay, it is said, must have been upwards of 10,000*l.* The rearing was celebrated by a dinner, at the Royal Hotel, Dale-street, to the architect, contractors, &c. together with about 140 of the men engaged in the works.

Doncaster.—A meeting of the local Cemetery Commissioners was held at the Town-hall here, on Wednesday before last, for the purpose of opening the tenders for the several works required in the erection of two cemetery chapels and a lodge and entrance gateway, after a design by Mr. R. J. Johnson, the architect. There were three complete tenders, and seven in all. It was unanimously agreed that that sent in by Messrs. T. and C. Anelay, of this town, builders, be accepted. It was also agreed to advertise for tenders for laying out the ground, according to the plans of Mr. Appleby, forthwith. The respective works, it appears, will be completed for the original sum proposed by the commissioners. "This," observes the local *Gazette*, "will set at rest the complaint of the competitors in the adoption of the present design, for competent parties have undertaken its completion at the amount not exceeding the sum fixed."

Huddersfield.—For a long time past the brethren of the "Sons of Truth" Lodge of Freemasons here, have felt the want of a suitable building for the transaction of their business, but not being able to meet with one, they resolved to build for themselves, and by perseverance this *desideratum* is now being accomplished, a site having been secured in Fitzwilliam-street, with frontage to the street, and ground being taken in the rear for a lodge-room, twenty-yards in length. On Wednesday before last, a number of the brethren met on the ground, and laid the "corner" stone, with the usual ceremonial, the building itself having been raised to the level of the ground. Brother W. H. Brooke is the architect; Brother J. Kirk, contractor; and Brother J. Ratcliffe, superintendent of works.

Keswick.—The foundation stone of a new building intended for a Mechanics' Institute and Lecture-hall, was laid on Saturday in week before last, at Keswick, by the Rev. T. D. H. Battersby, incumbent of St. John's Church in that town. The new building, which will adjoin the Keswick library, has been designed by Mr. G. Watson, jun. architect.

Wigan.—We are informed that the Burial Board has selected the designs of Mr. Barry, of Liverpool, for the erection of three chapels, two lodges, and railway-bridge, and that the works are to be commenced forthwith.

WAR, AND THEN THE ARTS.

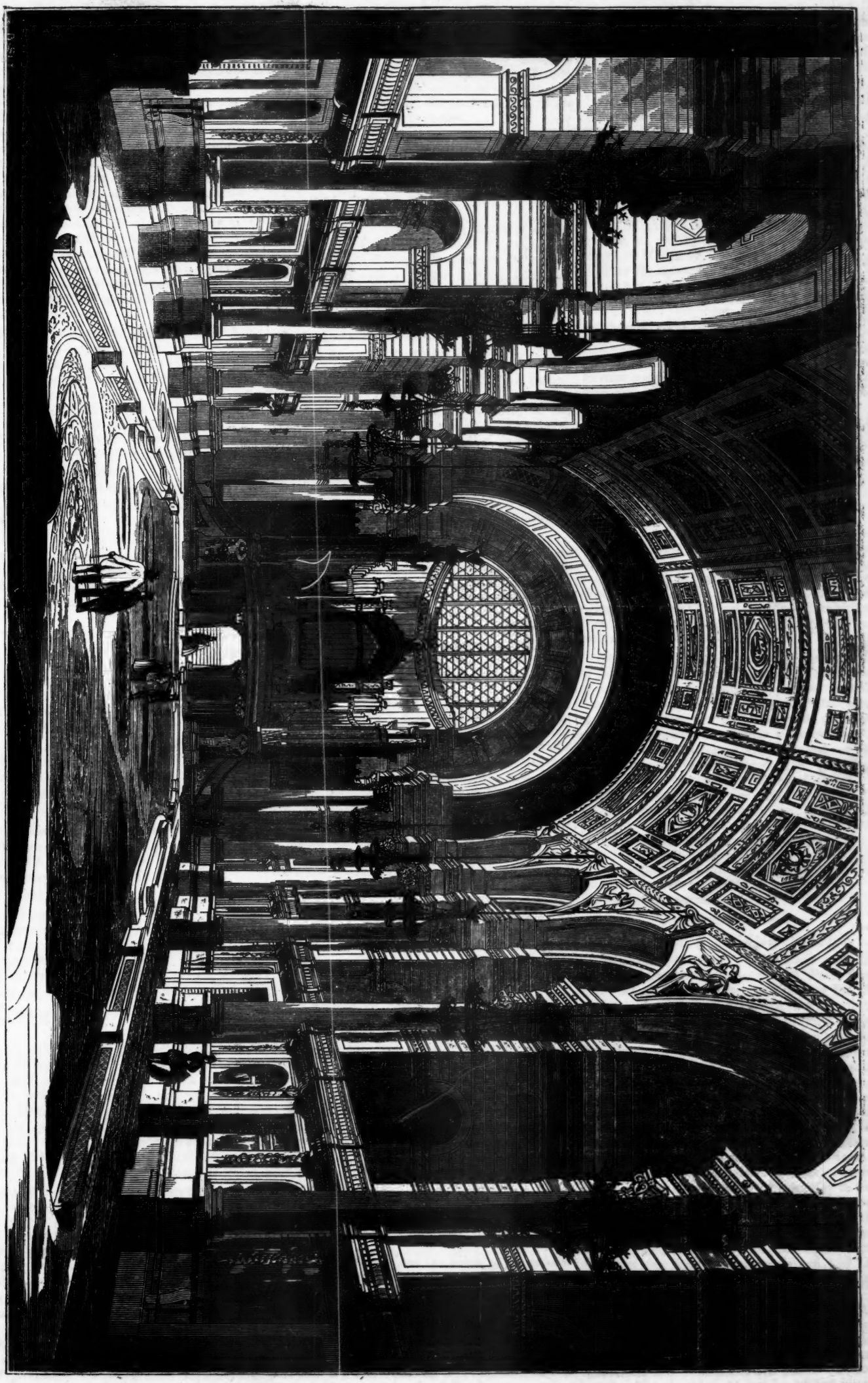
THE achievements of the warrior have exerted upon the arts a deep-felt influence, especially in the ancient heroic epochs. To the valour and to the victories of leading men in armies and in fleets we are indebted for some rich and attractive works of monumental art. Among these are master-pieces of the greatest sculptors. The finest and most complete effects of other arts—of painting, poetry, rhetoric, music, and the drama—have been produced in commemorating the warlike deeds of warlike men. Yet they have, perhaps, afforded to the art of sculpture, more particularly, some of the grandest subjects for representation. The awful—the tragical incidents of war,—the suffering borne with such fortitude by the wounded and dying,—the prompt action, the courage, and the skill of the soldiers,—these have called forth the abilities of the artist, and tasked his power of expressing the human passions.

The Parthenon of Minerva, at Athens, when in all its glory, exposed, to the view of the Athenians, the victories obtained by Theseus against the Centaurs and the Amazons,—victories which might have flattered their vanity, but which could not fail to have fired their bosoms with patriotism. These victories, sculptured by Phidias, were the objects of excessive admiration: they have always been esteemed the most celebrated relics of ancient art, and were worthy of the unrivalled fane they adorned.

The arts profited by the example of Phidias; and, although the frequent introduction of the Centaur in the metopes of the Temple was founded on a myth,—the mythology of Greece entering into everything,—yet we cannot but admire the agreeable form that the genius of Phidias gave to this mixture of the human figure with that of the horse; and we find a happy use was made of this in sculpture, chiefly as a temple-decoration, for several centuries.

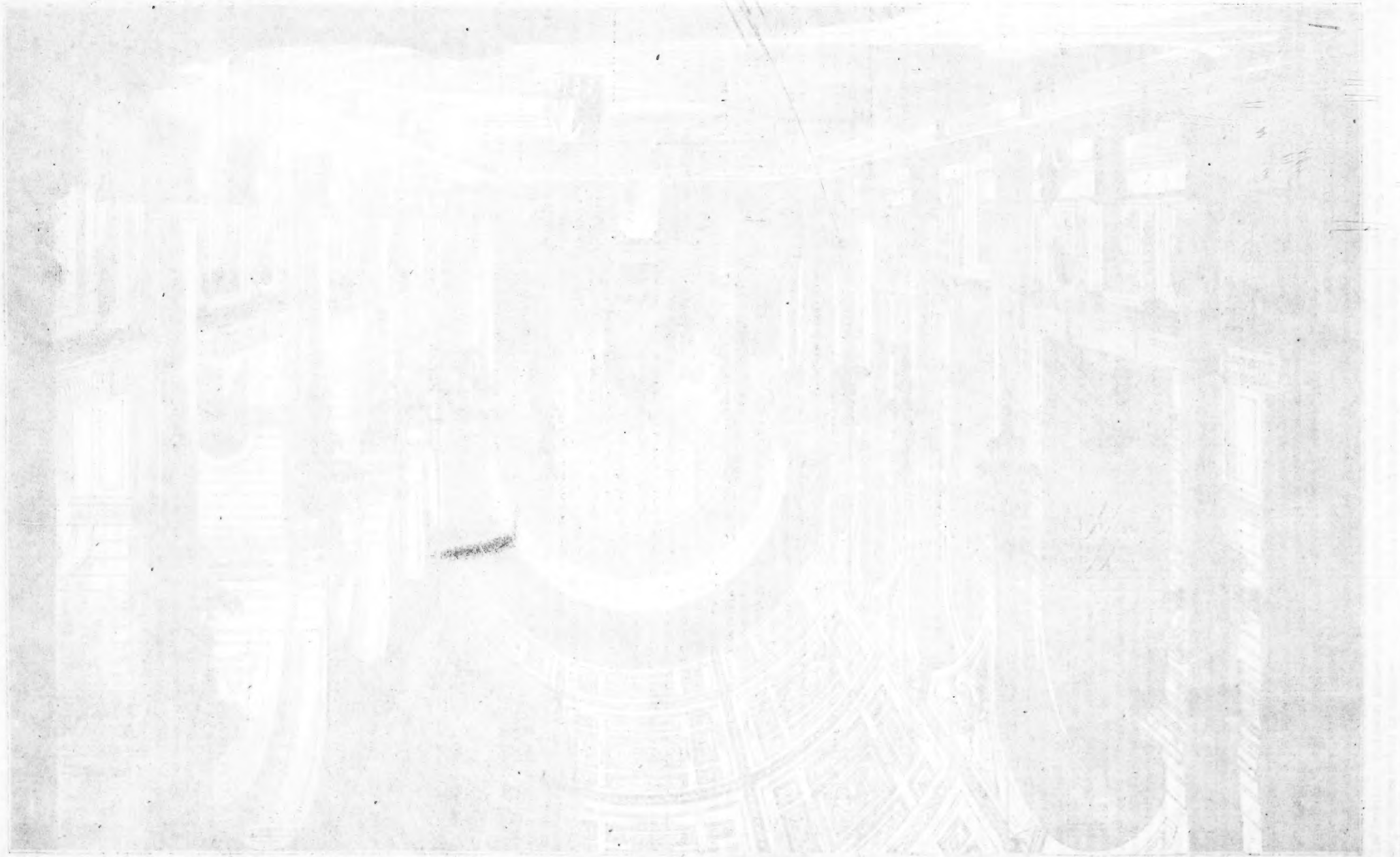
The representation of these battles was calculated to elevate and to perpetuate the glory of the Athenians; nor were the impressions which, as perfect works of art, they conveyed, lost upon them,—impressions which we ourselves, fortunately, are enabled to receive at the present hour.

F. L.



INTERIOR OF ST. GEORGE'S HALL, LIVERPOOL.—THE LATE MR. H. L. ELMES, ARCHITECT.

[see p. 1, *ante*.]



ON THE PUMPING OF WATER FROM PITS AND MINES.

THE fundamental principle that regulates the arrangement of the apparatus employed for the purpose of pumping water from pits and mines, is simply the statical equilibrium that obtains, between the pressure of steam in the cylinder of the engine, and the weight of the column of water whose transverse section or base is the piston of the pump, and altitude the vertical distance between the surface of the water in the pit or mine, and the point at which the water is discharged. When the condition of equilibrium has been obtained, it is easy in practice to give the engine the preponderance, either by increasing the pressure of the steam, by enlarging the diameter of the cylinder, or by diminishing the diameter of the pump. This, however, is a point peculiar to the province of the practical engineer: our present object is to investigate the condition of equilibrium, and to simplify the rules for calculating that condition; and for this purpose,

Put D = the diameter of the cylinder of the steam-engine in inches;
p = the pressure of the steam on a square inch of the piston in pounds avoirdupois;
w = the entire pressure of the steam on the piston of the cylinder; and
$0{\cdot}7854$ = the constant fractional coefficient, or the area of a circle of which the diameter is unity.

Then, by the rules of mensuration, the area of the piston is $0{\cdot}7854\,D^2$, and the whole pressure of the steam is

$$w = 0{\cdot}7854\,D^2\,p \quad \ldots\ldots\ldots\ldots \text{(A)}.$$

This equation represents one member of the equilibrium, and in order to obtain another member with which to compare it, we must extend the notation in reference to the pump as follows:—

Put d = the diameter of the pump in inches.
h = the height to which the water is raised in feet.
w = the whole weight of the column of water in pounds avoirdupois, and
$62{\cdot}5$ = the number of pounds in 1 cubic foot of water.

Then, by the rules of mensuration, the area of the pump-piston or bucket is $0{\cdot}7854\,d^2$, and the whole weight of the column of water is

$$w = \frac{0{\cdot}7854 \times 62{\cdot}5\,d^2 h}{144} \quad \ldots\ldots\ldots\ldots \text{(B)}.$$

This, therefore, is the other member of the equilibrium; consequently, by equating the members (A) and (B), and casting out the common quantities, we finally obtain

$$2{\cdot}304\,D^2 p = d^2 h \quad \ldots\ldots\ldots\ldots \text{(C)}.$$

Now, from this equation in the form it has here assumed, any one of the variable quantities which it involves, can be determined in terms of the other three, together with the constant multiplier or coefficient $2{\cdot}304$, which is the quotient of 144 divided by $62{\cdot}5$; that is, $\frac{144}{62{\cdot}5} = 2{\cdot}304$.

The equation marked (C) indicates the state of equilibrium between the pressure of the steam and the weight of water which opposes it when no work is performed, and we now proceed to determine from its analysis, the diameters of the cylinder of the engine and the pump when the condition of quiescence obtains, and also the effective pressure of the steam in the cylinder and the height of the column of water.

PROBLEM 1.—*To find the diameter of the pump, having given the diameter of the cylinder of the engine, the pressure of the steam on a square inch of the piston, and the height in feet to which the water is to be raised.*

Referring to the equation marked (C), which involves the conditions of equilibrium, and reducing it in reference to d, the symbol denoting the diameter required, we have—

$$d = \sqrt{\frac{2{\cdot}304\,D^2 p}{h}} \quad \ldots\ldots\ldots\ldots \text{(1)}.$$

Now, the form of this equation is sufficiently simple for every practical purpose; but nevertheless, it will be useful for those who are unacquainted with analysis, to have the mode of reducing the equation expressed in words, as follows:—

RULE.—*Multiply the square of the diameter of the steam cylinder by the pressure of the steam upon a square inch of the piston, and again by the constant number* $2{\cdot}304$; *then divide the product by the height of the column of water in feet, and the square root of the quotient will be the diameter of the pump in inches.*

With the rule thus expressed, there can be no difficulty in finding the diameter of the pump from the same data, in any case that may be proposed; but the solution of a numerical example, will tend greatly to elucidate the subject.

EXAMPLE 1.—Suppose the diameter of the cylinder of a steam-engine to be 22 inches, the the pressure of steam upon a square inch of the piston 25 lbs. and the height to which the water has to be raised 66 feet; what will be the diameter of the pump, when the weight of the column of water and the pressure of the steam are in equilibrio with each other?

Here, by the rule, we have—

$$d = \sqrt{\frac{2{\cdot}304 \times 22 \times 22 \times 25}{66}} = 20{\cdot}552 \text{ inches},$$

the diameter of the pump; therefore, in the case of an equilibrium, it will be $2{\cdot}304 \times 22^2 \times 25 = 20{\cdot}552^2 \times 66$. But in this case, there will be no water raised; therefore, in order to render the apparatus effective, either the number 22 or 25 must be increased, or $20{\cdot}552$ must be diminished, no matter which; yet it may so happen in practice, that one may be more advantageous than another.

PROBLEM 2.—*To find the diameter of the cylinder of the steam-engine, having given the diameter of the pump, the height to which the water is to be raised, and the pressure of the steam upon a square inch of the piston.*

Recurring to the equation marked (C), in which the conditions of equilibrium are represented, and reducing it in reference to D, the symbol denoting the diameter of the cylinder, we have—

$$D = \sqrt{\frac{d^2 h}{2{\cdot}304\,p}} \quad \ldots\ldots\ldots\ldots \text{(2)}.$$

This equation is not more difficult to reduce than the preceding one; but it is a little different in the manner of its composition; this, however, adds nothing to the labour of calculation, and the following is the rule for performing the operation.

RULE.—*Multiply the square of the diameter of the pump in inches by the height in feet to which the water has to be raised, and divide the product by* $2{\cdot}304$ *times the pressure of the steam on a square inch of the piston of the engine, then the square root of the quotient will be the diameter of the cylinder in inches.*

The following numerical example will show the manner of applying the rule:—

EXAMPLE 2.—Let the diameter of the pump be 26 inches, the height to which the water is to be raised 132 feet, and the pressure of steam upon a square inch of the piston of the engine 20 lbs.; what will be the diameter of the engine, when an equilibrium obtains between the pressure of the steam and the weight of water to be raised?

Here by the rule we have,

$$D = \sqrt{\frac{26^2 \times 132}{2{\cdot}304 \times 20}} = 44 \text{ inches},$$

the diameter of the cylinder. This is the diameter when the apparatus is in equilibrio; but in order that the engine may be made to preponderate, one or other of the quantities concerned must be altered, as stated in the previous example.

PROBLEM 3.—*To find the height of the column of water in feet, having given the diameter of the steam cylinder and that of the pump barrel, both in inches, together with the pressure of the steam on a square inch of the piston in pounds avoirdupois.*

Recurring to the equation of equilibrium marked (C), and reducing it in reference to the symbol h, we obtain the following expression for the height of the balancing column, viz.:—

$$h = \frac{2{\cdot}304\,D^2 p}{d^2} \quad \ldots\ldots\ldots\ldots \text{(3)}.$$

This equation is simpler in its reduction than either of the former two, seeing that there is no extraction of the square root required in the operation, and the following is the practical rule for its reduction.

RULE.—*Multiply the square of the diameter of the steam cylinder in inches by* $2{\cdot}304$ *times the pressure of the steam in pounds avoirdupois per square inch, and divide the product by the square of the diameter of the pump in inches, for the height of the column of water in feet.*

EXAMPLE 3.—Suppose the diameter of the steam cylinder to be 44 inches, and that of the pump 26 inches; what must be the height of a column of water, to equipoise a pressure of steam of 20 lbs. on a square inch of the piston?

Here the operation, according to the rule, is

$$h = \frac{44^2 \times 2{\cdot}304 \times 20}{26^2} = 132 \text{ feet},$$

the height of the column.

PROBLEM 4.—*To find what pressure of steam on a square inch of the piston of the engine, will balance a column of water* 132 *feet in height, the diameter of the steam cylinder being* 44 *inches, and that of the pump* 26 *inches.*

Referring to the equation of equilibrium marked (C), and disengaging the symbol p from the terms with which it is combined, we get as follows, viz.:—

$$p = \frac{d^2 h}{2{\cdot}304\,D^2} \quad \ldots\ldots\ldots\ldots \text{(4)}.$$

This equation, like the one immediately preceding, does not require the extraction of the square root; for the symbol p, whose value is represented by it, enters the equation of equilibrium only in the first degree, and consequently its value is found by simple multiplication and division, as directed by the rule following, viz.:—

RULE.—*Multiply the square of the diameter of the pump in inches, by the height of the column of water in feet, and divide the product by* $2{\cdot}304$ *times the square of the diameter of the steam cylinder in inches, for the pressure of the steam requisite to balance the column of water.*

EXAMPLE 4.—Suppose the diameter of the pump to be 26 inches, and that of the steam cylinder 44 inches, what pressure of steam will balance a column of water 132 feet in height, its diameter being the same as that of the pump?

Here, according to the rule, we have

$$p = \frac{26^2 \times 132}{44^2 \times 2{\cdot}304} = 20 \text{ lbs.}$$

the pressure required. T.

CHURCH-BUILDING NEWS.

Swalcliffe (*Banbury*).—On 22nd ult. the ancient church of St. Peter and St. Paul, Swalcliffe, which has been recently closed for the purpose of renovation, was reopened for Divine service. The pews have been lowered and rearranged, the unsightly gallery at the west end entirely removed, and the whole nave cleaned and renovated. At the east end of the chancel is a window of stained glass (the donation of the warden of New College), representing four incidents in the Old Testament, and the like number in the New. Six other windows in the chancel,—two of them presented by the Fellows of New College,—three, the gifts of private individuals,—and one, with the figures of St. Peter and St. Paul, presented specially to the vicar by the clergy and others of the neighbourhood,—may be noticed. The seats in the chancel, which are of oak, have been thrown open. The screen between the chancel and nave has been lowered and repainted, and the sounding-board, which for many years disfigured the pulpit, has been removed.

Gornal Wood.—The new chapel at Gornal Wood, for the Methodist New Connection, just erected by Messrs. Hinton, under the superintendence of Mr. Wigginton, architect, was opened on the 19th ult. when 199*l.* was collected. The chapel is 44 feet by 36 feet in the clear, and accommodates 550 worshippers, and,

instead of a pulpit, it is fitted up with a platform, circular on face, 14 feet by 7 feet, for the purpose of facilitating the holding of missionary meetings.

Teignmouth.—A small Roman Catholic Church was opened with considerable ceremony in this town on the 19th ult. It is dedicated to St. Charles, and is in the Gothic style, from plans by Mr. Hansom. The cost, including internal fittings, is about 1,000*l.* Mr. S. Hayman, of this town, was the builder.

Greenacres (*Oldham*). — A Congregational Church was opened here in August last, and occupies a lofty position on Greenacres-hill, near the town of Oldham. The plan is in the form of a cross, the nave and transepts being all of the same width and height. Five arches of brickwork spring from the angles of the cross, and support the roof, in lieu of wood principals. The tower contains a centre shaft, which finishes with a small spire, and is made to ventilate the interior of the church. Each arm of the cross is occupied by a gallery, and there is accommodation for 800 people. The extreme outside length is 73 feet 6 inches; ditto width, 56 feet 6 inches. The total cost was 2,100*l.* including heating apparatus, architect's commission, &c.

Greenock.—Miss Stewart, sister of Sir Michael R. Shaw Stewart, Bart. has given 10,000*l.* to endow an Episcopal Chapel in Port Glasgow, securing 200*l.* a year to a rector, and 100*l.* to a curate. A church, having chancel and nave, and a rectory and schools, will also be erected by the same lady, and will be finished by Whit-Sunday, 1856. The ground will be given by Sir Michael. The congregation is to be burdened only with the maintenance of the fabric, in which there is to be daily service, and the seats are to be free and unappropriated for ever.

SIGHTS AND SCENERY.

Royal Princess's Theatre.—The pantomime here is founded on the immortal story of "Blue Beard," and is very neatly put together. The best scene in it, so far as the painter is concerned, is the Enchanted Garden, by Mr. Gordon, and the most excellent for what is technically called the "business" of it, is the Quarter Deck of the *Royal Albert*, fully manned by a crowd of children. The imitation of the Spanish Dancers by the clown, Mr. Fuline, and the new French dance *La Flotte*, wherein the allied fleets are manœuvred on the heads of the ballet corps, are amongst the good points of the piece. Dramatically, the acting of Mr. C. Kean and Miss Heath, in "The Stranger," is the event of the week.

Royal Lyceum Theatre.—As usual in the extravaganzas at this theatre, Mr. Beverly puts forth his strength in the last scene of each act of "Prince Prettypet;" the first, a piece of fine painting, the Crystalline Haunt of the Butterflies; the second, one of those combinations of colour, mechanical arrangement, and pretty faces, for the invention of which the public are indebted to him. Scenes after the same type are now introduced at most of the theatres, but the originator maintains his ascendancy. The Crystalline Haunt is very like a scene in a previous piece, but is, nevertheless, singularly beautiful. The extravaganza is very well played and sung by Miss Gordon, Miss Ternan, and Mr. F. Matthews.

Theatre Royal, Adelphi.—The last scene of the first act of the extravaganza here, called "Zigzag Travels of Messrs. Danube and Pruth," represents the Banks of the Danube by Moonlight, and is very effective. It is of the character that Mr. Pitt does best. The piece itself is all about everything: it has some very good dancing in it, some pleasant singing, and one scene of genuine acting,—the fraternization of the French and English troops, represented respectively by Mr. Garden (very cleverly) and Mr. Paul Bedford. The descent of the "diving-belle" in the first scene is a good notion.

Theatre Royal, Drury-lane.—Touching the glittering and in many respects very clever pantomime here, we will allow a correspondent to speak for himself:—

"In the Drury-lane pantomime 'Jack and Jill' may be seen two gigantic sticks of celery, fixed to the O.P. and P.S. wings. They are of the full height (21 feet 6 in.), from the 'boards' (or stage) to the 'flies,' and were modelled from nature by 'Dykwynkyn,' whose real name has appeared in nearly every number of the *Builder* from its commencement as the patentee, &c. of a material intimately known to and extensively used by every architect of eminence in the profession, and of course by *builders* generally. 'Dykwynkyn' claims the merit of being the first who ever *attempted to model scenery*, and its subsequent treatment—colouring and decoration, and the said 'Dykwynkyn' disclaims all connection with." K. M. C.

The Polytechnic.—Some excellent additions have been made to the entertainments here, including a capital exposition by Mr. Pepper, of Professor Wheatstone's experiments on the developments of sound by means of reciprocating surfaces. A band playing in a distant apartment are unheard; but connect the different instruments, by means of thin rods of wood, each with the sounding-board of a harp in the lecture-theatre, and the music is audible to all as if it were present. The experiments prove, what we have often speculated on, that music might be *laid on* to the houses of a town from a central source like power, gas, or the water. A well-known joker, at the private view, proposed the establishment of a "band-ditty" company on the spot. The wild story of Sindbad the sailor, is told by Mr. George Hodder, and is charmingly illustrated by a series of dissolving views and other optical effects,—the best, as a whole, ever seen. And then there is Perkins' steam-gun, with all sorts of things besides.

THE DECAY OF STONE.

THE skilful combination of practice with science in your admirably conducted paper, induces me to send you the following observations, in the hope that they may prove interesting and useful to the intelligent practical men who read the *Builder*. The tower and spire of All Saints' Church, Wakefield, are built of the common sandstone of the neighbourhood, and are in a very dilapidated condition. The mortar used in the erection may fairly be supposed to have come from the nearest (which is also the best) source, and to be of the kind now employed, which is principally made from the magnesian limestone. Externally decay has done its work too completely to allow of the examination of its process which is possible within, and certainly when the perishing of the stone in this old building is taken in connection with certain appearances in new ones, much interest is attached to it. A few stones which have either been faulty when placed in the wall, or laid with vertical instead of horizontal beds, have perished variously, and often from the middle towards the edge. But, these excepted, the rule of decay is almost universally *from the edges towards the middle*, commencing at the stones' junction with the mortar. In the majority of instances, the tool marks in the centre are as fresh as when the workmen placed the stones in the building, while at each edge nearly every stone is perishing. The obvious inference from this is, that the contact between the mortar and the stone is the cause of the phenomenon. May not the *mode* of this action be learnt from what is seen in new buildings? The stone, when laid in a wall at first, is uniform in colour, and remains so for a few days, the time apparently depending upon the hygrometric state of the atmosphere, and the wetness of the mortar. Soon a dark discoloration is visible along the point, and creeps over much of the face of the stone, and I have even seen it extend over the whole of a quoin a foot square. In process of time, as the work becomes dry, the original dark band next the joint appears bleached, and remains permanently whiter than the rest of the stone. This *whitened portion* in modern work, corresponds accurately with the *perished portion* in the old, and if both have not the same origin, the coincidence is remarkable. But how are we to account for what we see take place at present? I believe analysis will show that the stone contains a soluble salt of the protoxide of iron as well as of soda. That the caustic hydrate of lime acts upon these, and withdraws so much of the iron as is within its reach (*i.e.* what was contained in the portion which becomes whitened), and forms a double salt with it, while it only deprives the soda salt of its acid. This latter gradually effloresces, whitening the stone, and causing it to decay. Confessedly this explanation is hypothetical till demonstrated by analysis, but yet I think the following fact will render it highly probable. When my church was built, the mortar for the external work was specified to be mixed with coal-ashes to darken it. For this I substituted sand from an ironfoundry, which after it is useless for moulding is mere waste. This necessarily contained a considerable quantity of protoxide of iron, and if the above explanation have any value, it ought to have prevented the phenomena witnessed, when lime is used in its normal state. Such was the fact. No discoloration and no subsequent bleaching were visible where this mortar was employed, whereas all the stone in the interior of the church exhibited the action of the mortar in a marked manner. It is now eight years (a considerable period for stone to remain uninjured by our smoke and wind), since the work was done, and I have not detected an instance of joint perishing in the whole. The stone inside a new church, recently erected in the town, is now passing through the dark stage, and I suppose by next summer it will reach the lighter one. The action of lime upon the bricks of this district, is to render them nearly as white from a soda efflorescence as if they had been dusted with flour. I should not have troubled you with these details, had they appeared generally known, which does not appear to be the fact. I called the attention of two friends, who are architects by profession, and of several practical builders, to the joint perishing, and its apparent connection with discoloration, and was informed that the subject was quite new to them. I thought, therefore, they might prove both interesting and useful. If so, two small walls of brick, and two of stone, might be built with each kind of mortar, and when all action appeared to cease, the mortar stones and brick in each case might be analyzed, and the results compared with an analysis of each made before the experimental walls were erected, and thus the question here raised would receive a solution.

W. R. BOWDITCH.

THE ABUSE OF WORKS BY LIVING ARCHITECTS.

No one, I suppose, will be bold enough to dispute the position of your correspondent "R. W." "that personal considerations should not be allowed to interfere with criticisms that have for their object the discovery of the truth." But there is a limit beyond which criticism loses itself, and begins to wear all the appearance of abuse, and when carried to this extent, I think it may well be doubted whether it in any way assists our progress towards the truth.

Suppose a man to have an earnest desire to enable the public to appreciate beauty in architecture. He begins to inculcate principles which he feels to be true and incontrovertible. Suppose, further, that they *are* so, and that he has put them forth in a clear, intelligible, and practical manner. Then his hearers and readers will be perfectly competent to decide for themselves on the merits of the buildings that are rising around them. He will have no occasion to go on and settle for them in strong language what buildings they may set down as bad, except, indeed, to minister to the indolence of those who like to have their thinking done for them, and to enable them to say, "I dislike it because Mr. So-and-so abused it." In any other way than this, the language of abuse can never add force to principles founded on truth; and if it be unnecessary, it surely is natural to expect that a critic of liberal mind will show a slight degree of consideration for private feeling by observing some moderation in his use of superlative adjectives.

M. A.

WATER IN COVENTRY.

As a humble inhabitant of Coventry, allow me to thank you for the well-merited strictures which appeared in your paper, on the late case of water-stealing which came before our magistrates; for the powers that be are so omipotent here that they are callous against any merely local rebukes. The true secret of this constituting of water-taking into a *criminal* offence is, that the corporation have of late years become *water sellers*, and, therefore, the water-works are converted into an engine of taxation. These waterworks, although established at the public cost, by the sale of public property, or the mortgaging of the public rates, are a most oppressive instrument in the hands of the corporation. Coventry has a large

and poor population, which formerly used to be plentifully supplied with good water from numerous public pumps and wells. These have, to a great extent, been destroyed, dried up by tapping the springs, or otherwise rendered useless; and then the corporation, having effected or permitted this spoliation, caused informations to be laid, by hundreds at a time, charging people with being destitute of water, and compelling them to lay on from the public works, in order to swell the corporation revenue.

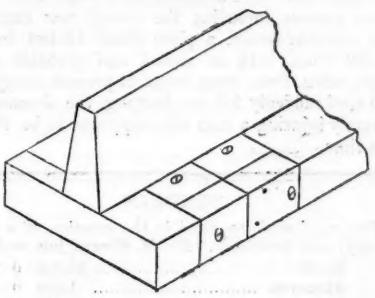
The principle of equity points out the old public gratuitous supply of water ought to be maintained; and I think it dictates with equal force, that inasmuch as the waterworks are the property of the town, the charge for water ought to be no more than is necessary to pay the working expenses, the interest of the capital, and a small annual amount towards the reduction of the debt upon them.

The manner of charging for water is also most anomalous and unfair. Under the Public Health Act, by which the corporation are enabled to compel persons to *purchase* water (after having dried up the gratuitous supply), they cannot charge more than at the rate of twopence per week; but under their own Waterworks Act they impose a water-tax of one shilling in the pound, on the full rental of a house. But then there is another system of compounding, whereby our householder, under certain circumstances, may get his water for little more than half what his next door neighbour does. In short, the entire system of water-supply, water-charge, and water-taxation in Coventry, is full of anomalies and injustice; and if the *Builder* can aid in the improvement or correction of such a system, by calling attention to it, a great boon will be conferred upon those who suffer from it.

A BURGESS OF COVENTRY.

STANDARD TO TEST LINEAL MEASURE.

BY an accident, the diagram showing the standard for testing lineal measures, proposed by the writer of the article in our last number (p. 664, vol. xii.) was not inserted. We now rectify the omission. The diagram is to about a one-third scale, and shows one end of the standard proposed. The bottom piece, or scale, is about 41 inches long, 3 inches broad, and ⅛ inch thick, with an edge-bar 1¼ inch deep. The material is straight-grained yellow pine, as full of turpentine as can be selected; and it is essential that the edge-bar shall be cut from the side of the same piece as the bottom or scale. The edge-bar is attached by six strong brass screws from under the bottom-piece. On one side of the scale there are four brass return-plates, and on the other side are two similar plates, all let in flush with the wood, and



securely screwed with brass screws; the four on one side being for 3 feet, and the two on the other for a length of 5 links of the land-chain. When finished, varnished, and suffered to stand by for a few weeks, the feet and links are struck off from the dividing-engine, taking an opportunity, when the temperature of the air is 62°, so as to get upon the wooden scale the true legal measure. A small plate of ivory or brass should be screwed on each side of the edge-bar, one stating that the measure is feet, the other links, with the temperature noted. Such a standard as this is strong, not liable to be put out of order, and is adapted for the office or workshop, for testing the various measures employed.

FIXTURES.

ELLIOTT AND BISHOP.

THIS was a special case in the Court of Exchequer, framed under the recent Act, for the opinion of this Court on facts which may be thus briefly stated:—

The plaintiff took a lease for 97 years of a newly-erected building in Camden-town, intended for a tavern, from the ground landlord, and, having expended a large sum of money in finishing and fitting it up fit for immediate occupation, he sold the lease, less a fractional part, to the defendant, for nearly 6,000*l.* including 5,000*l.* for goodwill, 501*l.* for trade-fixtures, and 72*l.* 16s. for tenant's fixtures, under the usual valuation. By the terms of the contract the new lease was to contain, and did contain, a clause which was in the original lease, and by that the defendant bound himself to give up the premises at the termination of his [lease, "together with all locks, keys, bars, bolts, marble and other chimney-pieces, foot-pieces, slabs, and other fixtures and articles in the nature of fixtures, which at any time during the said term should be fixed or fastened to the said demised premises or be thereto belonging." Under these circumstances the defendant objected to pay the valuation for the trade and tenant's fixtures, contending that the plaintiff had no right to remove them, and could not therefore sell them, in which predicament the defendant would also be at the termination of his sub-lease. The plaintiff, on the other hand, contended that the words "other fixtures" ought to be confined to fixtures *ejusdem generis* with those which preceded it in the clause in question, and the operation of which would then apply only to landlord's fixtures.

The Court also differed in opinion on this case.

Mr. Baron Parke was of opinion that the clause applied both to trade and tenant's fixtures, and that the plaintiff could not recover in respect of either.

Mr. Baron Platt was of opinion that the clause applied to neither, and ought to be limited to landlord's fixtures, in which case the plaintiff would recover for both classes of fixtures sold to the defendant.

Mr. Baron Martin took a middle course, and a judgment was delivered on his behalf to the effect that the plaintiff could recover for the trade-fixtures, and not for the tenant's fixtures.

The consequence of this diversity of opinion was, that the judgment of a majority of the Court was against Mr. Baron Parke, and for the plaintiff in respect of the trade-fixtures, and a majority against Mr. Baron Platt, and in favour of the defendant, in respect of the tenant's fixtures. In the end, therefore, judgment was given for the plaintiff for 50l. that being the agreed value of the trade-fixtures.

Judgment for the plaintiff accordingly.

Notices of Books.

VARIORUM.

We have a pile of books before us, and must speak at length of some of them hereafter. Messrs. Longman have issued a fresh edition (the third) of Gwilt's very valuable "Encyclopædia of Architecture," but we do not observe that any considerable additions have been made since the second. It should be possessed, and used, by every architectural student.——Neville's "Hydraulic Tables, Coefficients and Formulæ," published by Weale, may be very usefully consulted by all who have occasion to investigate the discharge of water from orifices, notches, weirs, pipes, and rivers. Mr. Neville is the county surveyor of Louth and Drogheda. An elaborate set of tables is appended.——The second volume of "The Chemistry of Common Life," by Jas. F. W. Johnston, M.A. (Blackwood and Sons), is completed, and is full of valuable information, conveyed in a very interesting form.——"The Handbook for Young Painters," by C. R. Leslie, R.A. (Murray), is a very important manual, fully illustrated.——The same publisher has issued a work in three volumes, on "The Origin and Progress of the Mechanical Inventions of James Watt," by J. P. Muirhead, M.A. which will afford us matter for an article.——The reports of the Analytical Commission of the *Lancet*, on the solids and fluids consumed by all classes of the public, have now taken the shape of a book, under the title of "Food and its Adulterations," by Arthur Hill Hassall, M.D. (Longmans). Mr. Wakley incurred great responsibility by publishing the names and addresses of the parties from whom the articles examined were purchased, and Dr. Hassall bears testimony to the strict impartiality and disinterested conduct of Mr. Wakley throughout the publication of the reports.

AN AMERICAN MILL.—The *Lowell* (Mass.) *Journal* speaks of a mill called the Pacific, at Lawrance, of which the floor surface is sixteen acres. There are now in operation in this mill, it states, 40,000 cotton spindles, and 10,000 worsted spindles, and these are to be increased to 80,000 and 20,000 respectively. There are 1,200 looms in operation, to be increased to 2,400. These, with 2,000 hands, produce 300,000 pieces of cloth per annum, one-half delaines. Once a month the 2,000 hands (females chiefly, it would appear) assemble at the cashier's office, when they are paid about 50,000 dollars for wages.

Miscellanea.

VALUE OF BUILDINGS AND GROUND IN MELBOURNE.—In one case, a house purchased for 250*l.* lately fetched 12,000*l.* Another offered to Government for the use of military officers for 3,000*l.* a month after was valued at 5,000*l.* They still hesitated, and the price gradually rose to 6,000*l.* which sum Government declined giving, having about that time received iron barracks. As another instance, Government long desired Degrave's blue-stone store, and made many liberal overtures, but without tempting the proprietor to sell. They at last asked him to name a price. He meditated awhile, and then, as his *ultimatum*, named 85,000*l.* The price of town-land is declared to be almost beyond credit, there being no limit to the extravagant idea entertained by buyers, as well as sellers, as to its value. Of late there has been a sad depreciation, however, in all sorts of merchandize here. The recoil of glut is found in almost every department, and as a consequence, numerous failures have taken place. Some accounts state that firms, worth 20,000*l.* six months since, could not now strike a balance of as many shillings in their favour. Artisans are said to be suffering proportionately from the depression.

THE IRON TRADE.—Prices, as usual, after being screwed up to the highest possible pitch, are now tumbling down faster than they rose. At the preliminary quarterly meeting of South Staffordshire iron manufacturers last week, there was a complete split of the self-constituted authorities in the trade of that district, the majority being determined to pull down prices, which they formally did, to the extent of 30s. a ton for sheet iron, and 20s. for other kinds, while some went even so far as to insist on a reduction of 40s.—a determination which they declared they would carry out by circulars dating from 1st January, notwithstanding the decision of the majority; and those, on the other hand, who resisted all reduction, announced that they left the meeting under no obligation to abide by its decision. The nominal prices of the majority are—bars, 10*l.*; hoops, 11*l.*; sheets, 11*l.* 10s. Ordinary hot blast pigs are quoted at 4*l.* 10s. to 4*l.* 15s. Manufacturers are said to be pressing hard on the pig-furnace proprietors, offering prices so low as to be equal to a reduction of 4*l.* a ton on finished iron. The American trade seems to be near a close, as there is scarcely an order for iron of any description from America. Whether it be now too late for lower prices to tempt the Americans back again remains to be seen. New iron fields are being opened in the west of Scotland.

MILITARY TRAINING.—A correspondent of the *Bath Herald*, "H. L." suggests that Government should invite teachers to employ drill-sergeants to teach the boys under their tuition the manual exercise. Painful as it is to think there is any necessity for cultivating a military spirit in this way, it certainly would have its advantages in a sanitary view, as we have often urged in more peaceful times; and should the rising generation not require to use their gymnastic and manual acquisitions under military circumstances when they grow up, so much the better; meantime, they will certainly have derived both physical and moral benefit from such training.

THE SCOTTISH ARCHITECTURAL EXHIBITION.—On Friday, the 29th ult. the Scottish Exhibition of Arts and Manufactures connected with architecture, was opened in the new Exhibition-hall and Galleries, Bath-street, Glasgow, when a numerous assemblage took part in the opening ceremonial, including the Lord Provost of Glasgow, Sir Archibald Alison, Sheriff Bell, and the Committee of Management. We shall return to the subject; meantime we may state that the building consists of two large halls and several ante-rooms. The largest of the apartments extends the whole length of the building, and is lighted from the roof. On the east side of this hall are five rooms, each fitted up in a different style. Over these is the second hall, also lighted from the roof, but, of course, only half the height of the principal apartment. In the front building towards Bath-street, there are also several smaller rooms, each appropriated to a particular department.

THE BUILDERS' BALL.—As already announced, the usual annual ball in aid of the Builders' Benevolent Institution, will take place on the 8th of February, at Willis's Rooms, St. James's. We hope the gentlemen connected with the trade—but more especially the ladies of their families—are doing their utmost to render this charitable assembly a brilliant one. The amount, by the way, required for the almshouses, is accumulating slowly. Why do not the trade make a grand effort to have them erected at once?

THE CITY STREET TOLLS AND DUES, payable by non-freemen, have been abolished, by order of the Common Council, a measure recommended by the Royal Commissioners. The net income the corporation lose by the abolition of the tolls amounts, it is said, to 4,593*l.* 13s.

GAS IN ROME.—The establishment here, under the management of Mr. Shepherd, is working well, and will return a good profit in the first year, a thing not very common in the annals of Continental gas-works. Great complaints are made of the way in which some of the work from England was done. The loss of gas was very great in consequence; but, by opening the ground and repairing, the evil has been cured.

LECTURES ON GOTHIC ARCHITECTURE AT DONCASTER.—Mr. E. B. Denison, Q.C. has been lecturing at Doncaster on Architecture, in connection with the parish church now in course of re-erection. The lecturer took occasion to combat the notion that the ornamentation of churches or even the building of them in the Gothic style, is connected with Popery; and showed how in all ages and in all countries of the world the passion for magnificent building, not only for religious but for all other public purposes, seems to be inherent in the minds of civilized men; and after giving amply sufficient illustrations of his statement, he remarked that it would be strange indeed if churches, which are intended for the highest of all public objects, should be the only public buildings consecrated to ugliness. As to the supposed connection between Gothic architecture and Popery, he said that it was a striking fact, that, although Gothic architecture arose among the nations who overran the ancient Roman empire and city, it had never been able to take root in Rome, the head-quarters of the Romish religion, or even in any part of Italy. It is equally remarkable that Gothic architecture decayed and fell long before the Reformation; that it was not revived by the Roman Catholics when it did revive; and that to this day they have not among them a single architect whose works are equal to several that could be named among our own. The best that can be said of their best architect, Pugin, he thought, is, that before his death he had learnt enough of architecture to confess that he had never erected a single church that was not a failure.

CATERHAM RAILWAY.—The directors of the company for forming a railway from Caterham to Godstone-road Station, and thence to the West Croydon Station, have introduced a new feature into their scheme. Considering that the value of the adjacent land will be increased in value by the formation of the line, they have secured 150 acres of it; and this, at the first meeting after the opening of the line will be conveyed to the shareholders or their nominees in the proportion of one acre to the holder of each twenty shares of the original capital, with power to such of the shareholders as desire it, on payment of their shares in full, to select and have immediate possession of the land, to be taken in respect of their shares, the order of selection to follow the order of the payments of the shares. Every resident freeholder or leaseholder on the estate is to be entitled to receive from the company a free pass over the railway for twenty-one years from the opening of the line.

FATAL SEWER ACCIDENT AT DERBY.—An inquest was held on Tuesday week, at the Town-hall, Derby, on view of the body of a labourer, who met his death by the bursting of a water-pipe in a new sewer at Duffield-road. It appeared from the evidence adduced that the trench, which is part of the sewerage works being carried on by the Board of Health, is 12 feet deep, and 2 feet 6 inches broad. By the side of it runs a cast-iron water-pipe, which broke, and the water, as well as the earth upheaped upon the pipe (the near proximity of which the workmen were unaware of), rushed upon the deceased, and he was suffocated. An hour elapsed ere the body could be extricated, and life was then extinct. The jury found a verdict of "Accidental death," but strongly recommended that greater caution should be observed in future in the removal of the stretchers, more especially where the sewerage was deep.

STRENGTH OF BRICKS.—In your publication of last Saturday, in the paragraph headed, "A Brick," you stated there must be some mistake in the figures. We beg respectfully to state that the weight referred to by the *Athenæum* was the lateral strength of the brick, and not the weight required to crush it. The way these are tested, is by placing them on bearings, 7 inches apart, and the breaking weight is applied to the middle of the brick. We shall be glad if, in your next, you will be kind enough to correct this, your remarks referring to the capability of bricks to resist a crushing force. These experiments have been made long since. *We* refer solely to the *lateral* strength of the brick, and we are not aware that up to this time any experiments have been published relative to bricks so tested. It is important that it should be stated in its true light. We know of no brick which will bear the same pressure: the average of twenty-five only has been given. Several were upwards of 8,600 lbs. and one of them sustained a pressure of 8,733 lbs.—T. and W. F. BEALE.

*** The patentees should have stated their experiment differently.

BATHS, &c. IN BERLIN.—Baths and wash-houses on the model of those at St. Martin's, are in course of erection at Berlin. The fittings in the first-class rooms are of pale apple-green enamelled slate. Those in the second-class rooms, swimming-bath, drying-rooms, &c. are of plain polished slate. We are informed the whole of the slate work is being executed at the Pimlico Slate Works. It must be gratifying to the proprietor, Mr. Magnus, to see his invention of enamelling slate adopted by almost every architect of eminence at home, and gradually finding its way into works of magnitude on the continent.

FALSE CERTIFICATES AND DISHONEST APPROPRIATION OF MONEY.—Proceedings have recently taken place in the Court of Bankruptcy, in Basinghall-street, City, which we would much rather pass over in silence were it not that honesty itself demands a record of it in our pages. Mr. Wallen, a surveyor, or as he is called in the bankruptcy proceedings, "an architect, surveyor, and builder," of Lawrence Pountney-lane, City, has been declared bankrupt, with this blot upon his name, that the Judge, Commissioner Evans, declares the bankrupt to have been "guilty of a gross fraud," and "of getting money (500*l.*) on false certificates" as to work done, and which money he appropriated to expenditure, on his own part, in itself unjustifiable, instead of paying it over to another to whom it ought to have been paid. The bankrupt's certificate was, therefore, adjourned for one year, and, when granted, to be of the third class; protection also to be suspended for six months. A certificate of execution was also granted to the gentleman, Mr. Liddell, to whom the 500*l.* ought to have been paid, and who had been compelled to give a mortgage for 340*l.* in an action by Mr. Durant, who had paid the money to Wallen.

QUARRYING.—An experiment has just been made at Nitshill, near Glasgow, which promises, it is said, to introduce an improvement in the art of quarrying. Mr. Dove, a quarrier at Nitshill, had received an order from the Clyde trustees for a supply of large foundation stones for the new quay on the south side of the harbour. A post of rock, 52 feet long, 9 feet wide, and 7 feet 6 inches high, was operated upon. Behind it a row of holes was drilled down at about 7 feet apart, and the whole depth of the post. Each of these was charged with about 7 lbs. of gunpowder, and all were fired simultaneously by electricity. The whole mass was shoved forward about half an inch, and lifted so much off its bed that the smoke of the powder was seen escaping from below. The quantity raised was about 250 tons in weight, and this with only 14 lbs. of powder. The battery used for firing the train had had thirty-six pairs of plates, 10 feet by 12 feet. A mass of rock, 3,000 tons in weight, was next prepared to be operated upon in the same way, but we have not heard of the result.

CITY CROSSINGS.—There are some of our street crossings which are extremely dangerous after dark, and accidents are constantly occurring. Going from the City to West-end daily, the first passage I have to make is from Fenchurch-street to Lombard-street, which, on a slippery night, is not accomplished without difficulty. Then comes the bewildering pass to get to the Mansion-House. Here I often see ladies waiting hopeless and helpless, until some one politely volunteers to "put" them across. St. Paul's offers the next puzzle, and your mind is not easy until you have done Ludgate-street and Fleet-street. A bridge was proposed over these places, but the plan has difficulties. I would suggest that as the danger is most seriously felt after dark, a flood of light should be brought to bear on all important crossings. I do not consider myself rash or incapable, but I have frequently been nearly run over at these places, for the simple reason that the want of light has prevented me from seeing the presence of danger.—G. C.

NEW MOTIVE POWER.—A series of experiments with M. Du Tremblay's system of employing ether in conjunction with steam on board steam-vessels, and thereby, it is said, obtaining a great increase of motive-power, at less expense than that of steam by the existing system, were made lately at Toulon, on board a vessel called the *France*, which had been supplied with the necessary engines. These experiments are reported to have been attended with perfect success. The average speed obtained is said to have been nearly nine knots an hour, with a saving of fuel compared with the existing system of 50 per cent.

GLASS A SUBSTITUTE FOR MARBLE.—An American, we hear, has invented a process by which glass is made to perfectly resemble, and answer all the purposes of marble, at 50 per cent. less cost. Centre tables, mosaic floors, grave slabs, monuments, and even statuary as per mould, are the alleged fruits of this process. "The quarries of Carrara," says the *New York Churchman*, "can yield no more delicately-veined blocks: the sand that lies in the hill side, the open field, or out on the beach yonder, touched by the inventive genius of our age, becomes marble."

NEW FIBROUS MATERIALS FOR PAPER MANUFACTURE.—Ever since some paragraphs on the scarcity of paper material appeared in our columns, we have had occasional communications offering suggestions and enclosing specimens of materials. The latest of these latter has been forwarded to us by a correspondent at New Orleans, Mr. Walter Carswell, who appears to have patented its adaptation to paper manufacture, and is desirous to bring it into notice. To this end Mr. Carswell forwarded specimens to our Government, who referred the matter to the Board of Inland Revenue, the latter of whom appears to have reported favourably of its felting and other adaptabilities to paper manufacture, but the Government declined, as a matter of course, to interfere with actual production or trading operations. So far as regards ourselves, not being brokers we cannot entertain Mr. Carswell's proposals as to "brokerage," but we are willing to afford him the benefit of our circulation in assisting to bring the material referred to into notice. It consists of masses of strong and tough flax-like fibrous matter singularly matted together, or "anastomozed," as a physiologist would say, were it a mass of blood-vessels instead of vegetable fibres. We have examined the fibrous structure with a microscope, and find that it would appear to be easily reducible to very fine filaments, which, from their curiously interlaced arrangement, even as they are, we are disposed to think the report of the Board of Inland Revenue right in believing to possess a felting property adapted to paper manufacture. The Board have some doubt as to its bleachable quality, but they had it tested only with acids, whereas Mr. Carswell finds that alkalis do bleach it, and we have little fear but that chemists would find no difficulty with it in this respect.

TELEGRAPHIC.—A Dublin merchant has obtained a verdict for 20*l.* damages against the Magnetic Telegraph Company for failing to send a message which they undertook to transmit to a person in Scotland. The case for the defence was that their contract in this instance, as in all cases, was to be subject to casualties arising from the state of the weather; and that on the occasion in question, owing to that cause, they were unable to send the message further than Belfast.

SURVEY OF THE TOWNSHIP OF NEW BRENTFORD, MIDDLESEX.—At the meeting of the Board of Guardians, Brentford Union, on the 27th ult. Mr. Paine was appointed to the survey of the parish and township of New Brentford, subject to the approval of the Poor-Law Board.

DEATH FROM FALL OF A ROOF AT BRIERLY-HILL.—On Wednesday before last, a girl was killed by the falling-in of an arched brick roof of a smoking-house, at a small pottery at the Thorns, near Brierley-hill. The deceased, with some four or five other persons, including the owner, was engaged in the smoking-house, a place about 12 feet long and 8 feet wide, with an arched roof probably 10 feet high, when, from some cause at present unexplained, the roof suddenly fell in, burying the deceased, and severely injuring a man who happened to be there at the time.

TENDERS

For wood-work required in the erection of a shed at Batley, near Dewsbury. Mr. M. Sheard, jun. architect.

Booth	£1,145 0 0
Akeroyds	1,050 0 0
Stead	1,030 0 0
Fozard	990 0 0
Laycock	979 0 0
Williams	899 0 0
Fawcett (accepted)	742 0 0

For additions and alterations to the workhouse for the parish of Paddington. Mr. George Parminter, architect. Quantities supplied by Mr. Northcroft.

Myers	£10,234 0 0
Harding	9,985 0 0
B. and C. Hayne	9,972 0 0
Patrick and Son	9,788 0 0
Batterbury	9,739 0 0
J. and C. W. Todd	9,399 0 0
Lindfield	9,308 0 0
Rowland and Evans	9,296 0 0
C. Bennett	9,070 0 0
Higgs and Cullingford	9,015 0 0
Hopkins and Roberts	9,000 0 0
Wm. Higgs	8,999 0 0
Pollock and M'Lennan	8,860 0 0
S. Wilson (accepted)	7,951 0 0
Rudkin	7,950 0 0

TO CORRESPONDENTS.

Royal Academy Prizes.—The prize for best painting from life was awarded to Mr. E. F. Holt (not "Hall," as misprinted in the list already given).

"*Glue.*"—How can I obtain the strongest glue for wood known to the arts; I mean for articles of small size? The marine glue, so indispensable for shipbuilding, does not answer my purpose. I believe the composition made use of by bow-and-arrow manufacturers is excellent, but I am not cognizant of its ingredients.—ARTIFEX.